

Can Intra-Articular Therapies Prior to Total Knee Arthroplasty Increase the Risk of Periprosthetic Infection?

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SUMMARY

Intra-articular therapies, such as steroid injection, viscosupplement injection and acupuncture, are common non-surgical options for patients with osteoarthritis of the knee. With any intra-articular injection or acupuncture procedure, there is a potential for inoculation with bacteria leading to possible knee infection. The authors report a patient who incurred an acute infection found after a total knee arthroplasty attributed to prior acupuncture procedure done as part of conservative treatment.

KEY WORDS:

Infection, intra-articular therapy, total knee arthroplasty

INTRODUCTION

Deep periprosthetic joint infection is a rare occurrence in total knee arthroplasty (TKA), but is one of the most feared complications among orthopaedic surgeons. Deep infections have been reported to be less than 1%, but the sequelae of prosthesis removal and associated increase in mortality rate are catastrophic. Common pathogens isolated are *Staphylococcus aureus* and *Staphylococcus epidermidis*, followed by *Streptococcus* species.¹

The option of TKA is usually considered after failing conservative management. Intra-articular steroid injection and viscosupplement injection are examples of conservative managements offered. Although these are seemingly harmless procedures with infection rates in the range of 1 in more than 70,000², they may result in prosthetic joint infection when done in close proximity to TKA operation.

In Asia, acupuncture as a treatment option for knee pain attributed to OA knees is easily and widely available. Many patients obtain them through Traditional Chinese Medicine practitioners, where aseptic techniques may not always be ascertained. Woo *et al*³ had described case reports of septic arthritis of the knees after acupuncture therapy.

To the best of our knowledge, this is the first case report of a patient who incurred an acute infection after a total knee arthroplasty attributed to prior acupuncture procedure done as part of conservative treatment. The authors also discuss the management for patients with ongoing intra-articular therapy who are being scheduled for surgery.

CASE REPORT

A fifty-seven year old lady was admitted into our institution for an elective left total knee arthroplasty. She was diagnosed with polymyalgia rheumatica six years prior and her condition was controlled with methotrexate and prednisolone given by her rheumatologist.

Osteoarthritis of her both knees became clinically apparent four years ago and progressively worsened with tricompartmental involvement. Trial of analgesia, glucosamine, injection of paladin sodium hyaluronate and physiotherapy were futile.

She started going for acupuncture therapy under a licensed Traditional Chinese Medicine practitioner two years earlier. During each session, alcohol wipes were applied before placement of disposable needles. Her last visit was two weeks prior to her total knee arthroplasty.

She had no previous history of septic arthritis or trauma to her knee.

On admission, she was afebrile and clinically well. The peripheral leukocyte count was found to be within the normal limits on pre-operative investigation. She underwent left total knee arthroplasty with antibiotic-loaded bone cement. The operation was uneventful. Routine synovial cultural and histology were done. Synovial culture was positive for methicillin-sensitive *Staphylococcus aureus* (MSSA).

She was clinically well post-operatively. The wound was clean and no pus was seen. Post-operative investigations showed peripheral leukocyte count was $9.7 \times 10^9/L$; C-reactive protein (CRP) level was 48.5 mg/L, erythrocyte sedimentation rate (ESR) was 105mm/hr and blood culture was negative.

In view of the intra-operative culture findings, infection disease (ID) consultation was made. Intravenous cefazolin (2gram 8 hourly), which was started immediately after operation, was replaced with intravenous penicillin G (4megaunits 4 hourly) for a total of six weeks. Antibiotic was then oralized to amoxicillin for a total antibiotic duration of 6 months.

Subsequent peripheral leukocyte count, CRP and ESR normalized. At 2-years follow-up, patient was asymptomatic and radiological images showed no sign of prosthetic loosening. (Fig. I and Fig. II)

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Fig. 1: Pre-operative imaging showing tricompartmental osteoarthritis.



Fig. 2: Post operative imaging at 2 year.

DISCUSSION

Osteoarthritis of the knee is highly prevalent. Patients advance the therapeutic ladder from physiotherapy and oral medications to more invasive intra-articular therapy. Often before total knee arthroplasty was decided, many patients would have tried at least one of the three procedures; intra-articular steroid injection, viscosupplement injection and acupuncture.

The risk of overt septic arthritis from these procedures under aseptic technique is small, in the range of 1 in 70,000.² However occult infection may not be clinically apparent.

We define occult infection as quiescent infection. The patient is clinically well and asymptomatic. However, septic markers may or may not be elevated. Definitive diagnosis is made upon isolation of the pathogen on culture.

To our knowledge, we found no article that addresses this concern although there were reports of infection after acupuncture therapy in native knees or in post total knee arthroplasty.

We are concerned of the possibility of occult infections in this group of patients for total knee arthroplasty, especially when acupuncture is a widely used and readily accessible therapeutic modality among our patients.

In light of this case report, the author would like to propose steps to reduce the risk of prosthetic infection in this group of patients.

Operation should be postponed for at least three months if patient was noted to undergo acupuncture during clinical assessment. In this period, monitoring for normal peripheral leukocyte counts and C-reactive protein is recommended.

In the event of elevated inflammatory markers, we suggest knee aspiration to be done and sent for white cell count and culture. Any infection detected should be treated with surgical drainage and debridement. Appropriate ID consult should be made and antibiotics administered according to sensitivity of the pathogen. Inflammatory markers should normalize before total knee arthroplasty.

The value of synovial culture and gram stain intra-operatively for primary TKA have not been clearly established.⁴ However, this case report provides insight of the potential benefit seen in this subgroup of patients for early targeted management. Early treatment of prosthetic joint infection allows implant retention with high success rate without long-term antibiotic suppression. In addition, evidence proving the inoculation of bacteria prior to operation put surgeons at better ground in terms of medicolegal disputes.

Finally, the use of antibiotic loaded bone cement during total knee arthroplasty for this group of high risk patients is advisable. Based on large retrospective studies conducted by the Norwegian Arthroplasty Registry,⁵ there are evidence to show benefits of the use of antibiotic-loaded bone cement in arthroplasty.

CONCLUSION

Surgeons need to be aware and cautious when advocating total knee arthroplasty in patients who had prior knee procedures especially acupuncture therapy. It is prudent to evaluate patients with raised inflammatory markers and obtain synovial cultures at the time of surgery. This will help in decreasing the likelihood of early infection following TKA in patients with prior acupuncture procedure.

REFERENCES

1. Verdonk PCM, Vansintjan P, Verdonk R, *et al.* Infection after Total Knee Arthroplasty: Diagnosis, Management Strategies and Outcomes. In: Kienapfel H, Kühn K-D, eds. *The Infected Implant*: Springer Berlin Heidelberg; 2009: 43-59.
2. Seror P, Pluvinage P, d'Andre FL, *et al.* Frequency of sepsis after local corticosteroid injection (an inquiry on 1160000 injections in rheumatological private practice in France). *Rheumatology*. 1999; 38(12): 1272-4.
3. Woo PC, Lau SK, Yuen KY, *et al.* First report of methicillin-resistant *Staphylococcus aureus* septic arthritis complicating acupuncture: simple procedure resulting in the most devastating outcome. *Diagn Microbiol Infect Dis*. 2009; 63: 92-5.
4. Mehra A, Hemmady MV, Nelson R, *et al.* Bacteriology swab in primary total hip arthroplasty-- does it have a role? *Int J Clin Pract*. Jun 2006; 60(6): 665-6.
5. Espehaug B, Engesaeter LB, Vollset SE, Langeland N *et al.* Antibiotic prophylaxis in total hip arthroplasty. Review of 10,905 primary cemented total hip replacements reported to the Norwegian arthroplasty register, 1987 to 1995. *J Bone Joint Surg Br*. Jul 1997; 79(4): 590-5.